


PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P 62338	FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/EP 02/14341	International filing date (day/month/year) 16.12.2002	Priority date (day/month/year) 16.12.2002	
International Patent Classification (IPC) or national classification and IPC B29C43/22			
Applicant DARAMIC, INC.			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 1 sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input checked="" type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 12.05.2004		Date of completion of this report 20.04.2005	
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized Officer Schmidt, H Telephone No. +31 70 340-2461	



**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP 02/14341

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-8 as originally filed

Claims, Numbers

2-10 as originally filed
1 received on 12.05.2004 with letter of 13.04.2004

Drawings, Sheets

1 as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP 02/14341

Box No. II Priority

1. ☒ This report has been established as if no priority had been claimed due to the failure to furnish within the prescribed time limit the requested:
☒ copy of the earlier application whose priority has been claimed (Rule 66.7(a)).
☐ translation of the earlier application whose priority has been claimed (Rule 66.7(b)).
2. ☐ This report has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rule 64.1). Thus for the purposes of this report, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-10
	No: Claims	
Inventive step (IS)	Yes: Claims	1-10
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-10
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:

- D1 US-A-5578373
- D2 EP-A-608137
- D3 EP-A-467323
- D4 EP-A-875349
- D5 EP-A-721021

2. The present claims 1-10 appear to be novel over the available prior art acc. Art. 33(2) PCT

2.1 D1 discloses heating UHMWPE powder ($10-1000 \mu\text{m}$, MW $1.2-8 \times 10^6$) on an endless belt, which is sintered to a film at 130°C , stretched and rolled; the porosity of the powder, the separate sintering step and the heating means are not disclosed (the rollers are heated, not the material by air)

D2 discloses hot air as heating, but only in an orientation step, not for a sintering furnace

D3 discloses a process similar to D1, but uses also cooling by metal rolls (example 3), the porosity of the material, separate sintering step and the heating means are not specified, but cannot be heated air

D4 discloses a similar process for PTFE, but compression and sintering is done at the same time (110/151 in the figures)

D5 discloses compression molding of UHMWPE $1.2-6.0 \times 10^6$ part. diameter $< 1000 \mu\text{m}$ on endless belts at $110-135^\circ\text{C}$ rolled to a film of strength $10-200 \mu\text{m}$; in step e) the particles are fused together, but also compressed (smoothened); the heating means is not heated air but hot rollers and an infrared preheater

3. The present application meets the criteria of Article 33(1) PCT, because the subject-matter of claims 1-10 involves an inventive step in the sense of Article

3.1 Document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and discloses (the references in parentheses applying to this document):

UHMWPE powder (10-1000 μm , molecular weight $1.2\text{-}8 \times 10^6$) is preheated and roll compressed at 130°C using endless belts of rollers with heating means, the film is stretched by rolling and laminated to other material.

Document D1 does not disclose limits for the porosity of the material resulting from the process. Moreover, there is no distinction between a sintering step and the subsequent rolling step as in the present application. There is no indication that the preheating step can be considered as sintering. Due to the difference in the apparatus, the sintering is not done by heated air

Distinguishing features between D1 and the present application hence are: the distinction between a sintering step and the compression step and the heating by hot air.

The problem to be solved hence is to design a process for preparing a film having low porosity.

The problem is solved by a process using an apparatus with a separate sintering and compressing step, whereby the sintering is done by hot air.

According to the arguments of the applicant as filed with letter of 9.12.2004 (page 2, last paragraph), the subsequent steps of sintering and compressing lead to a film with less pores because the enclosed air can escape better than in the prior art process. Such an effect of the present solution was not to be expected by the skilled man even if the present process would have been known. The present solution hence has to be regarded as inventive (Article 33(3) PCT)

Patent Claims

1. A process for manufacturing foils for coatings, especially ski and snowboard linings and bearing coatings, from high and ultra-high molecular polyethylene, polypropylene and/or poly(vinylidene difluoride) characterized in that powdered polyethylene, polypropylene and/or poly(vinylidene difluoride), optionally with the addition of colours and/or additives, is spread on a sintering belt circulating in a sintering furnace operated with heated air, thermally sintered and compacted by smoothing rollers to form a foil material with a porosity of 0 to 10%, preferably < 1%.
2. A process according to claim 1 in which the foil material is compacted to a porosity of < 0.5% and following the compacting step cooled in a water-bath or by fan cooling for adjusting the crystallinity.
3. A process according to claim 1 or 2 in which the foil web is coated with another foil material, fleece or the like during the compacting step.
4. A process according to anyone of claims 1 to 3 in which poly(tetrafluoroethylene) is added to the polyethylene, polypropylene and/or poly(vinylidene difluoride).
5. A process according to anyone of claims 1 to 4 in which fleeces for thermal diffusion, coatings, screens, felts, glass mattings, tissues of glass fibre and plastics blends, carpet tissue and/or carbon materials are applied to the foil web.
6. A process according to anyone of claims 1 to 5 in which together with the polyethylene, polypropylene and/or